BROOKS INSTRUMENT DIVISION
EMERSON ELECTRIC
HATFIELD, PENNSYLVANIA, U.S.A.

DESIGN SPECIFICATIONS

DS-346
April, 1966

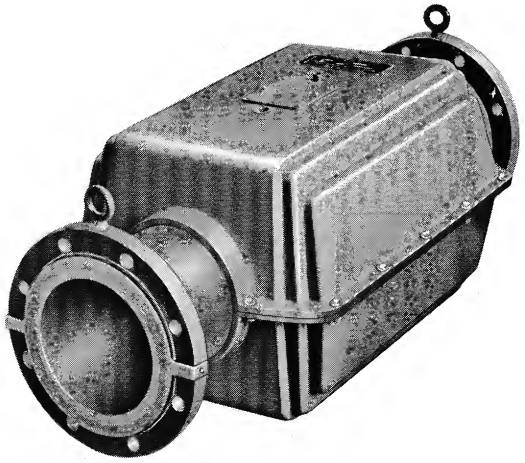
DS-346

BROOKS MODEL 346 ELECTROMAGNETIC FLOWMETERS

DESCRIPTION

The Brooks Model 346 Electromagnetic Flowmeter in conjunction with the Brooks Model 356 Signal Transmitter permits accurate, obstructionless flow measurement of almost any liquid. Flowmeter applications are almost unlimited: clear liquors, opaque solutions, caustics, acids, slurries with solids.

Installation is easy and no field adjustments are necessary. Once the transmitter is in place and all wiring has been installed, the system is ready for immediate use. No start-up adjustments are necessary.



Model 346 Flowmeter

PRINCIPLE OF OPERATION

The Model 346 Flowmeter measures volumetric liquid flow rate. Its fundamental operating principle is based on Faraday's law of electromagnetic induction, which states: The voltage induced across any conductor, as it moves through a magnetic field at a right angle to the lines of flux, is proportional to the velocity of that conductor.

In the Brooks Flowmeter, a straight pipe is located in a magnetic field created by field coils. Stainless steel, platinum, Hastelloy-C*, Haynes Alloy and electrodes of other materials are mounted in a plane at right angles to the magnetic field. These electrodes contact the fluid and act like brushes in a generator. They provide a means by which the voltage induced in the moving fluid is brought out for external measurement. This induced voltage (flow signal) is a direct and linear function of fluid velocity. For a fixed area transmitter, the measured voltage is a direct indication of the volume flow rate through the tube.

DESIGN FEATURES

Unobstructed flow

Unaffected by conductivity changes

Interchangeable components

Compact installation

Adjustable ranges

* TRADEMARKS
HASTELLOY - - - - - - - - - - - - - Union Carbide Stellite Co.
KEL-F - - - - - - - - - - - - - - - Minnesota Mining & Mfg. Co.
NEOPRENE, TEFLON - - - E. I. duPont de Nemours & Co., Inc.

SPECIFICATIONS

Electrodes

316 stainless steel
Platinum
Hastelloy-C
Haynes Alloy

Ambient Temperature

150°F (Maximum)

Conductivity

As low as 5 micromhos/cm

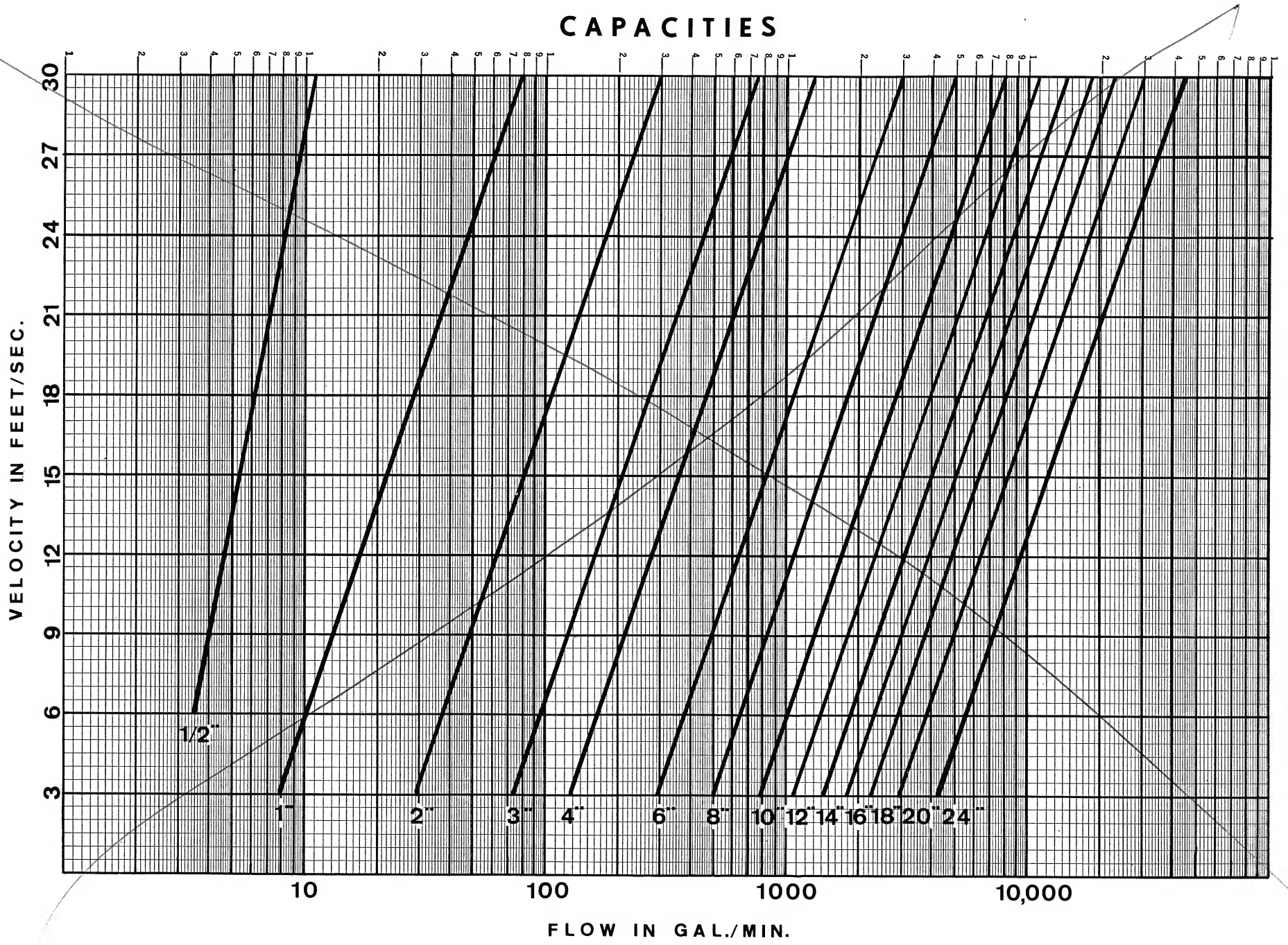
Accuracy

± 0.50% (with Brooks Model 356 Signal Transmitter and Recorder)
± 0.75% (with dc voltage or current output)

Meter Size (in.)	METERING TUBE			LINER		Max. Liquid Temp. °F	Operating Pressure Limits At Max. Temp. (psig)	Max. Oper. Pressure at 150# ASA Flanges	Max. Liquid Temp. °F at Maximum Operating Pressure	POWER REQUIREMENTS			
	Material	Description	Flanges[1]	Material	Thickness (in.)					Volts ± 10% 60c	Volts-Amperes	Power (Watts)	Current (amperes)
0.5	304 Stn. Stl. Pipe	Schedule 40	150# ASA	Teflon*	.055	300	210	275	100	115	1000	50	8
1	304 Stn. Stl. Pipe	Schedule 40	150# ASA	Teflon	.055	300	210	275	100	115	1000	50	8
2	304 Stn. Stl. Pipe	Schedule 40	150# ASA	Teflon Kel-F* Neoprene Pure Rubber	.055 .015 .125 .125	300 250 170 180	210 225 248 248	275 275 275 275	100 100 100 100	115	520	50	4.5
3	304 Stn. Stl. Pipe	Schedule 10	150# ASA	Teflon Kel-F Neoprene Pure Rubber	.075 .015 .125 .125	300 250 170 180	210 225 248 248	275 275 275 275	100 100 100 100	115	816	80	7
	Fiberglas	Havey 9710	150# ASA	None Required	.250	(Note 2)	150	150	(Note 2)				
4	304 Stn. Stl. Pipe	Schedule 10	150# ASA	Teflon Kel-F Neoprene Pure Rubber	.085 .015 .125 .125	300 250 170 180	210 225 248 248	275 275 275 275	100 100 100 100	115	920	90	8
	Fiberglas	Havey 9710	150# ASA	None Required	.250	(Note 2)	150	150	(Note 2)				
6	304 Stn. Stl. Pipe	Schedule 10	150# ASA	Teflon Kel-F Neoprene Pure Rubber	.100 .015 .125 .125	300 250 170 180	200 225 230 248	230 230 230 230	200 200 170 180	115	1035	100	9
	Fiberglas	Havey 9710	150# ASA	Fiberglas	.3125	(Note 2)	150	150	(Note 2)				
8	304 Stn. Stl. Pipe	Schedule 10	150# ASA	Teflon Kel-F Neoprene Pure Rubber	.150 .015 .125 .125	300 250 170 180	200 225 230 120	230 230 230 230	200 200 170 180	115	1300	120	11
	Fiberglas	Havey 9710	150# ASA	None Required	.3125	(Note 2)	150	150	(Note 2)				
10	304 Stn. Stl. Pipe	Schedule 30	150# ASA	Teflon Kel-F	.163 .015	300 250	210 120	275 120	100 250	230	2300	100	10
		Schedule 5	150# ASA	Neoprene Pure Rubber	.1875 .1875	170 180	120 120	120 120	170 180				
	Fiberglas	Monofilament wound	150# ASA	None Required	.375	(Note 2)	150	150	(Note 2)				
12	304 Stn. Stl. Pipe	Schedule 5	150# ASA	Kel-F Neoprene Pure Rubber	.015 .1875 .1875	250 170 180	165 165 165	165 165 165	250 250 180	230	2760	200	12
	Fiberglas	Monofilament wound	150# ASA	None Required	.375	(Note 2)	150	150	(Note 2)				

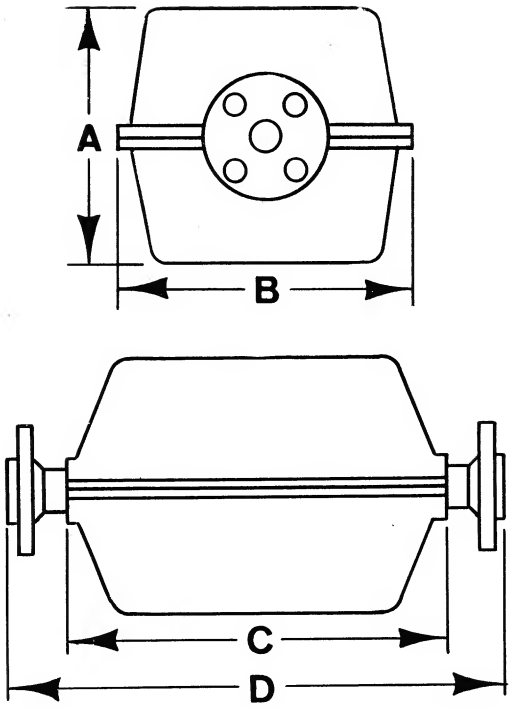
NOTES:
1. Optional 300 and 600 lbs. raised faced flanges are available. Fiberglass flow tubes are offered only with 150 lb. flanges.
2. On fiberglass flow tubes, working temperature varies for different liquids.
3. Other electrical characteristics are available on request.

CAPACITIES


VELOCITY IN FEET/SEC.
30
27
24
21
18
15
12
9
6
3
1/2"
1"
2"
3"
4"
6"
8"
10"
12"
14"
16"
18"
20"
24"
10
100
1000
10,000
FLOW IN GAL./MIN.

DIMENSION (For certified dimension prints, write to our factory.)

Meter Size (in.)	DIMENSIONS				Approx. Weight (lbs.)
	A	B	C	D	
0.5	9	9 1/2	12 5/8	15 3/4	45
1	9	9 1/2	12 5/8	15 3/4	50
2	9	9 1/2	12 5/8	16 1/4	55
3	14	14 1/2	21 1/4	27 1/2	130
4	14	14 1/2	21 1/4	30	150
6	17	21	28 1/2	36	250
8	17	21	28 1/2	42	300
10	23	26 7/8	38 3/8	48	550
12	23	26 7/8	38 3/8	48	600



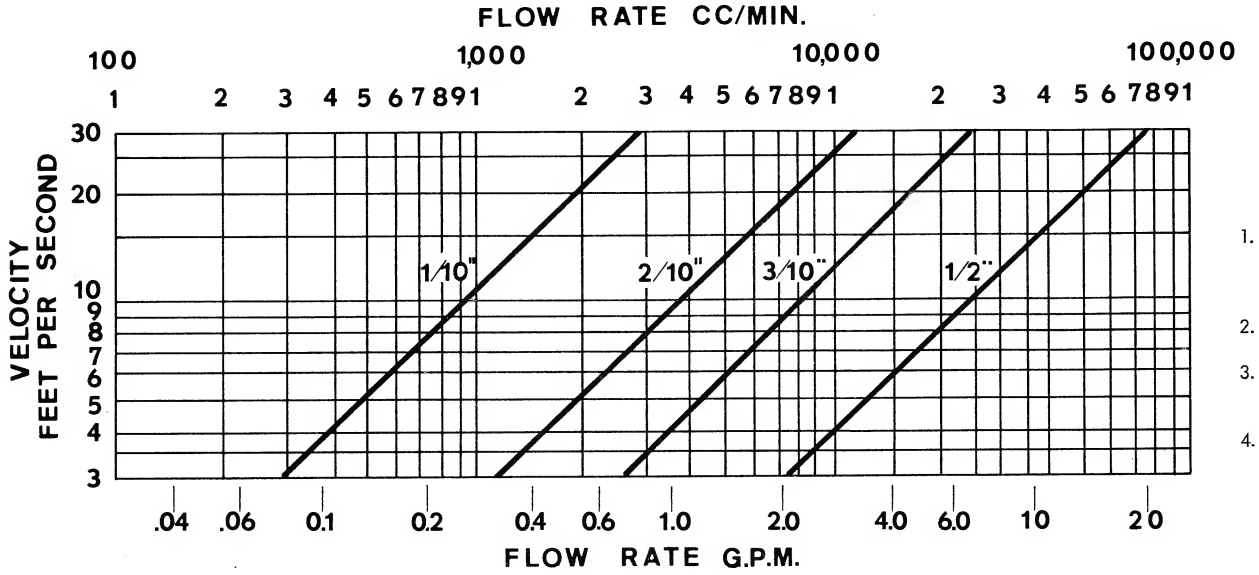
ORDERING INFORMATION

To order, please specify:
1. Identity of liquid
2. Meter size
3. 304 stainless steel or fiberglass pipe
4. Type of electrode

(Please submit a completed specification sheet No. 10130 with each inquiry.)

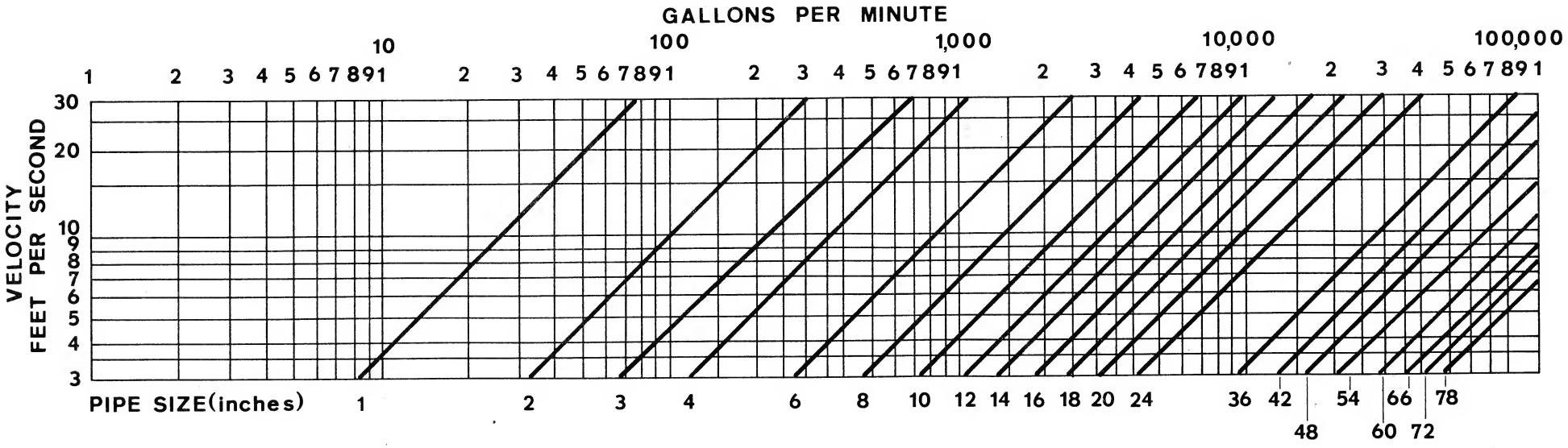
These specifications are subject to change without notice.

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CAPACITIES

1. Any value selected between 3 and 30 feet per second is full scale reading (higher than 30 F.P.S. and lower than 3 F.P.S. full scale values are available - consult Hatfield).
2. Range - 0-100% of any selected full scale value.
3. Any flow head is Field Adjustable for any maximum flow value between 3 and 30 F.P.S.
4. Values shown are nominal values.



DATA SHEET for ROTAMETERS

BROOKS
INSTRUMENT DIVISION
EMERSON ELECTRIC CO.
HATFIELD, PA. 19440

NO. OF ROTAMETERS REQ'D..... TYPE REQ'D: OPEN TYPE ☐ FULLY ENCLOSED ☐

FLUID TO BE METERED IS

FLUID IS: LIQUID ☐ VAPOR ☐

FLUID IS: TRANSPARENT ☐ TRANSLUCENT ☐ OPAQUE ☐

REQ'D FLOW RATES: MAXIMUM....., NORMAL....., MINIMUM....., UNITS.....

FLOW IS: STEADY ☐ PULSATING ☐

SP. GR. OF FLUID IS.....REFERRED TO WATER AS 1.0 / AIR AS 1.0

VISCOSITY OF FLUID IS..... SSU / CPS / CTKS AT..... °F,..... SSU / CPS / CTKS AT..... °F,.....

OPERATING PRESSURE..... TEMPERATURE.....

ALLOWABLE PRESSURE LOSS.....

MATERIAL DESIRED FOR FITTINGS?....., PACKING.....

PIPE CONNECTIONS SHOULD BE SCREWED ☐ FLANGED ☐

WHEN LOOKING AT FRONT OF ROTAMETER, CONNECTIONS SHOULD FACE:

INLET, LEFT ☐ RIGHT ☐ FRONT ☐ BACK ☐ DOWNARD ☐

OUTLET, LEFT ☐ RIGHT ☐ FRONT ☐ BACK ☐ UPWARD ☐

ARE EXTERNAL ATMOSPHERE CONDITIONS NEUTRAL OR CORROSIVE?

IF CORROSIVE, ATMOSPHERE IS ACID ☐ ALKALINE ☐ SOLVENT ☐ OR.....

IS ROTAMETER TO BE MOUNTED ON: FRONT OF PANEL ☐ BACK OF PANEL ☐

REMARKS:-

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ADDITIONAL DATA FOR REMOTE INSTRUMENTS.

TYPE REQ'D:
- INDICATING - RECORDING ☐
- INDICATING - RECORDING - INTEGRATING ☐
- INDICATING - RECORDING - CONTROLLING ☐
- INDICATING - RECORDING - CONTROLLING - INTEGRATING ☐
- RATIO CONTROL ☐

TRANSMITTING EXTENSION SHOULD BE ABOVE ☐ BELOW ☐ THE ROTAMETER.

CURRENT AVAILABLE

FLUID PRESSURE AT INLET TO CONTROL VALVE

MAXIMUM ALLOWABLE PRESSURE LOSS ACROSS CONTROL VALVE

NAME..... Company.....

TITLE..... Address.....

SALES ENGINEERING OFFICES

IN USA

OFFICE	TELEPHONE #	TERRITORY # (see other side)
ALABAMA, Mobile 36606 Frank A. Thomas Co., P.O. Box 6415	471-1593	54
ARIZONA, Scottsdale 85252 J. T. Aldrich Co., Box #1221	945-8598	36
CALIFORNIA, Montebello 90640 Gene D. Pribble Co., 3106 W. Beverly Blvd.	723-8881	16
San Francisco 94124 Stevenson-Angus, Inc., 1485 Bayshore Blvd.	467-9750	33
COLORADO, Englewood 80110 James B. Drummond, 3021 South Broadway	789-2281	19
DELAWARE, Wilmington 19806 Brooks Instrument, P.O. Box 1368	655-2382	29
FLORIDA, Boca Raton 33432 LeRoy Rogers Co., 110 Sea Island Lane, Univ. Park	395-7922	26
St. Augustine 32084 LeRoy Rogers Co., P.O. Box 1428	824-2607	26
GEORGIA, Atlanta 30305 Stallings, Inc. 3098 Piedmont Rd. N.E.	231-2540	53
HAWAII, Honolulu 96812 Berkley Engr'g & Equip. Co.,P.O. Box 3856	581-921	65
ILLINOIS, Des Plaines 60016 Brooks Instrument Division, 2510 Dempster St.	824-0105	59
INDIANA, Indianapolis 46241 Booth/Spearing Corp.,5335 W. Raymond St.	244-7819	61
IOWA, Des Moines 50303 Miller & Morse Company, Inc. Keo Way, P.O. Box 741	243-4287	32
KENTUCKY, Anchorage 40001 Whinery Engr'g Company, P.O. Box 107	245-0236	15
LOUISIANA, Baton Rouge 70821 Petro Chem Equipment, Box 358	348-7593	35
MARYLAND, Balitimore 21218 Brooks Instrument, 19 East 21st. Street	685-3277	29
MASSACHUSETTS, Newton Centre 02159 King Gage Engineering Corp. 33 Trobridge St.	244-7200	3
MICHIGAN, Grand Rapids 49502 Smith Instrument & Equipment Co.,900 Monroe, N.W.	451-2931	11
Warren 48089 Smith Instrument & Equipment Co.,24487 Gibson Drive	757-2550 539-3920	11
MINNESOTA, Minneapolis 55408 George R. Mellema Co., 3430 Nicollet Ave.	827-2616	18
MISSOURI, St. Louis 63122 The E. B. Miller Co., 10117 Manchester Rd.	966-8250	50
NEW YORK, Albany 12203 O. R. Lawrence Co., 7 Norman Avenue	438-6071	4
Buffalo 14226 O. R. Lawrence Co., 4446 Main St., P.O. Box 2698	839-4422	4
New York 10017 Brooks Instrument Division, 301 E. 47th Street	753-4628 (New Jersey) 661-1188	2
Syracuse 13211 O. R. Lawrence Co., 101 Pickard Dr., Box 245	454-4621	4
NORTH CAROLINA, Charlotte 28211 Robert S. Hudgins Co., P.O. Box 17217	366-4887	5
Greensboro 27404 Robert S. Hudgins Co, P.O. Box 10205	299-7982	5
OHIO, Cincinnati 45231 Brooks Instrument Division, 1172 W. Galbraith Rd.	522-8610	87
Cleveland 44134 Process Valve & Equipment Co., 4517 Brookpark Road	749-0040	8
Marietta 45750 Process Inst. & Equipment Co., Inc. Box 175	374-6767	34
OKLAHOMA, Tulsa 74127 Ernie Graves Company, 201 S. Houston	584-4708	12
OREGON, Portland 97211 Branom & Leeland Inst. Co., 6019 N.E. Union Ave.	285-5205	27
PENNSYLVANIA, Hatfield 19440 Brooks Instrument Division, 407 W. Vine Street	855-5174	1
Pittsburgh 15234 John F. Kraus & Co., 345 Mt. Lebanon Blvd.	531-1200	21
SOUTH CAROLINA, Greenville 29604 Robert S. Hudgins Company, P.O. Box 8254, Station A	232-7025	5
TENNESSEE, Memphis 38117 Janis Equipment Co. 4711 Poplar Ave.	683-1511	22
TEXAS, Dallas 75230 Gay Engineering & Sales Co., P.O. Box 8414	368-2325	13
Houston 77019 Gay Engineering & Sales, Co., 5425 Blossom Street	869-3306	13
VIRGINIA, Bon Air 23235 Dynamation, Inc. 2060 Buford Rd.	272-5000	52
WASHINGTON, Seattle 98121 Branom & Leeland Inst. Co., 2137 Second Avenue	622-7320	27
WEST VIRGINIA, Charleston 25329 Process Inst. & Equip. Co., Inc. P.O. Box 2428	342-2151	34
Huntington 25701 Process Inst. & Equipment Co., Inc. P.O. Box 2035	523-9658	34
WISCONSIN, Milwaukee 53216 Chipley & Jensen, Inc. 3500 N. Sherman Blvd.	442-8170	17

OUTSIDE USA

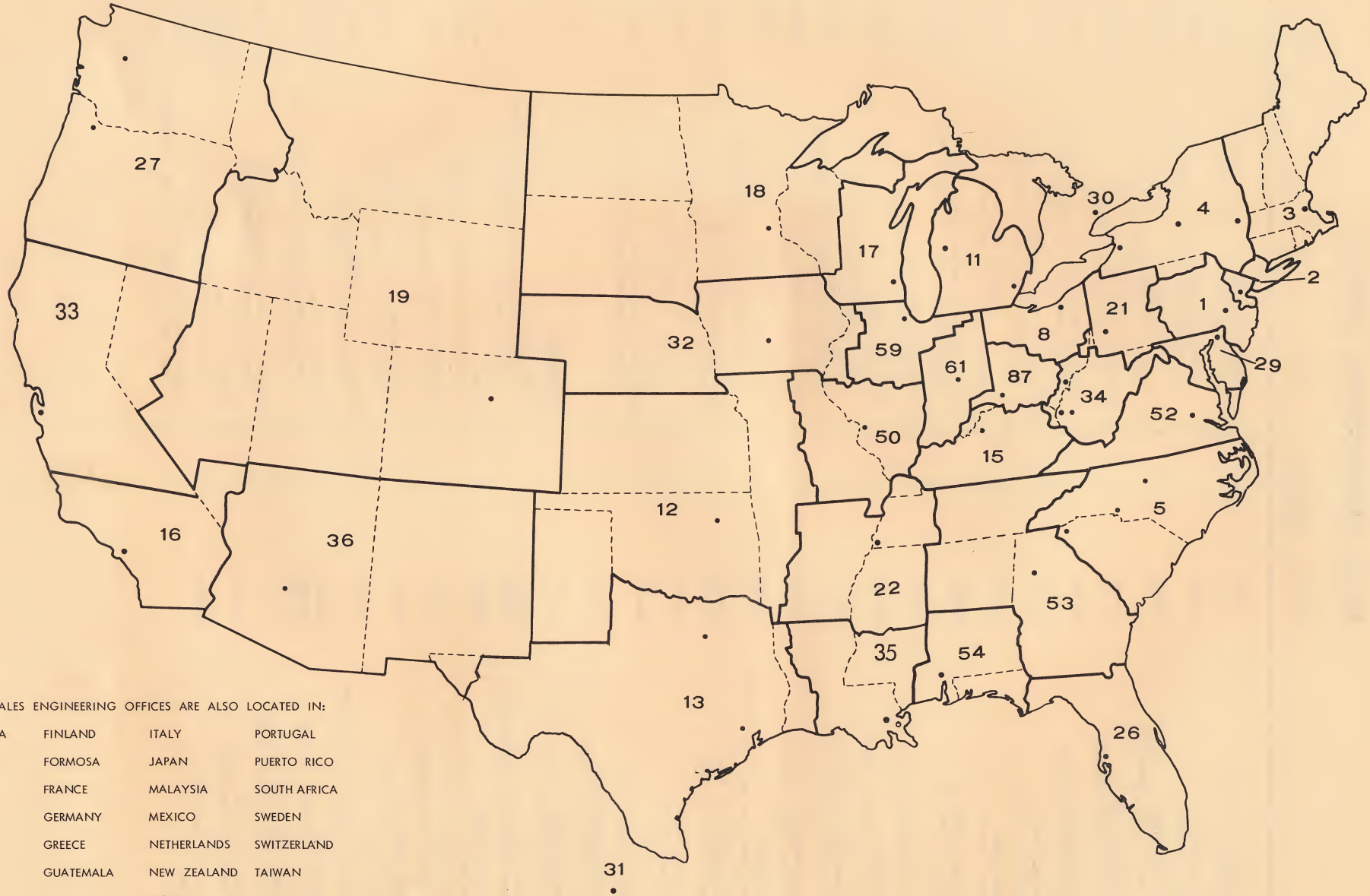
BRAZIL, Sao Paulo Sociedade Brasileira De Equipamentos Industriais Ltda. Praca Dom Jose Gaspar, 134, Conjunto 34		
MEXICO, Mexico City 7, D.F. Servo-Mex., S.A., Apartado Postal 28-601	Mexico City 25-50-10	31
PUERTO RICO, Santurce Mario R. Franceschini, P.O. Box 9393	3-4511	40
ALBERTA, Edmonton Glenor-Agents & Suppliers Ltd., 10357 58th. Ave.	434-5742	30B
BRITISH COLUMBIA, Vancouver 3 Proval Equipment Ltd., 550 Beatty Street	684-7571	30C
MANITOBA, Winnipeg Mechanical Valve & Engineering, Specialties (Man.) Ltd. 184 Henry Avenue	WH2-1912	30D
NOVA SCOTIA, Dartmouth, Maritime Provinces Industrial Suppliers Ltd., 13 Waddell Street	466-2461-62	30F
ONTARIO, Scarborough Brooks Instrument Canada Ltd., 32A Howden Rd.	PL 9-5640-48-49 GA1-3874	30
QUEBEC, Montreal 28 Brooks Instrument Division, Suite 220, 3300 Cavendish Blvd.	482-9121	30A

BROOKS INSTRUMENT DIVISION
EMERSON ELECTRIC CO.

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Hatfield, Pennsylvania 19440

In Europe: BROOKS INSTRUMENT N.V., VEENENDAAL, HOLLAND
In England: BROOKS INSTRUMENT LIMITED, MARPLE, CHESHIRE



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CANADA	GREECE	NETHERLANDS	SWITZERLAND
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DENMARK	INDIA	PERU	VENEZUELA
ENGLAND	ISRAEL	PHILLIPPINES	WEST INDIES

TO: BROOKS INSTRUMENT DIVISION, EMERSON ELECTRIC CO.

Have Sales Engineer stop in to discuss a specific application, make recommendations, and quote prices.

Best time for him to call is on

Send us a quotation. Flow data is as follows:

FLUID _____ (Name) **LIQUID** ☐ **GAS** ☐

SPECIFIC GRAVITY _____ **PRESSURE** _____ **TEMP.** _____

FLOWRATE: MAX. _____, **NORMAL** _____, **MIN.** _____, **UNITS** _____

IS FLOW PULSATING? _____ **VISCOSITY** _____ **UNITS** _____

INDICATE ☐ **RECORD** ☐ **CONTROL** ☐ **TOTALIZE** ☐

NUMBER REQUIRED? _____ **REMARKS:** _____

Send Descriptive Literature on the following subjects:

☐ SP-1100	Full-View® general purpose rotameters	☐ DS-8000	Sight flow indicators
☐ SP-3600	Ar-Met® high pressure & temperature meters	☐ DS-1400	High pressure flow indicators
☐ DS-3611	Ar-Met® Thru-Flow rotameters	☐ DS-3600	High pressure purge meters
☐ SP-5500	Flow Rate transmitters	☐ B-150	Corrosive service rotameters
☐ SP-1300	Brooks-Mite* & Sho-Rate* purge meters	☐ B-116	By-Pass, large flow rotameters
☐ SP-1500	E/C* low cost, small flow indicators	☐ DS-6000	Flow rate alarms
☐ B-1200	Rotameter flow test kits	☐ B-250	Brookseal* Diaphragm seals
☐ DS-8800	Self-Contained Rotameter / Controllers	☐ DS-5200	Level control instruments
☐ B-40	Turbine flowmeters	☐ DS-7000	Specific gravity indicators
☐ DS-59	Thermal flowmeters	☐ SP-1050	Vol-U-Meter® gas flow calibrators
☐ EM-10	Emflux magnetic flowmeters	☐ SP-9900	Weight/Time calibrators
☐ DS-OVAL	Oval positive displacement flowmeters		

*Trademark Brooks Instrument Division, Emerson Electric Co.

PLEASE TYPE OR PRINT TO ASSURE OUR ADDRESSING YOU CORRECTLY

NAME _____ **POSITION** _____

FULL COMPANY NAME (If Division, indicate.) _____

ADDRESS (Include Box No., if any.) _____

CITY _____ **ZONE** _____ **STATE** _____

NATURE OR TYPE OF BUSINESS _____

JUST STAPLE AND DROP IN MAIL

Thank you . . .

for your interest in our products.
Attached is the information
you requested.

If you want . . .

- more detailed data
- other product literature
- a field engineer to see you,

just fill in the other side of this form and drop it in the mail.



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INSTRUMENT DIVISION
EMERSON ELECTRIC

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